Supplemental Table 1: Characteristics of Utilized Commercial SARS-CoV-2 Assays

Manufacturer	Assay Name	Target antigen (recombinant)	Platform	Manufacturer's Interpretation
Euroimmun, Lubeck, Germany	Anti-SARS-CoV-2 ELISA (IgG)	Spike-1 protein	Manual ELISA	Negative: S/C ratio <0.8 Borderline: S/C ratio ≥0.8 & <1.1 Positive: S/C ratio ≥1.1
Hangzhou Biotest Biotech Co. Ltd., Hangzhou, China	CoronaCHEK™ COVID-19 IgG/IgM Rapid Test Cassette	Spike RBD	Lateral Flow Assay	IgG and IgM Positive: Three lines appear IgG Positive: Control and IgG lines appear IgM Positive: Control and IgM lines appear Negative: One line in control region Invalid: No control line
Bio-Rad Laboratories, Inc., Hercules, CA, USA	Platelia SARS-CoV-2 Total Ab assay	Nucleocapsid Protein	Manual ELISA	Negative: S/C ratio < 0.8 Equivocal: S/C ratio ≥ 0.8 & < 1.0 Positive: S/C ratio ≥ 1.0

Abbreviations: ELISA, enzyme-linked immunosorbent assay; S/C, signal to control; RBD, receptor binding domain.

Supplemental Table 2a: Demographic Characteristics Associated with Previous Infection among 2595 Emergency Department Patients, January –March 2021

Characteristics	Category	Crude OR (95% CI)	Adjusted OR (95% CI)
Age	18-29 years	1.00	1.00
	30-44 years	0.93 (0.70, 1.24)	0.86 (0.64, 1.16)
	45-59 years	**0.77 (0.57, 1.05)**	**0.78 (0.57, 1.07)**
	60-74 years	**0.71 (0.52, 0.98)**	**0.78 (0.56, 1.08)**
	≥ 75 years	0.80 (0.52, 1.24)	0.94 (0.60, 1.46)
Sex	Male	1.00	1.00
	Female	1.06 (0.86, 1.30)	1.04 (0.84, 1.28)
Race	Black	1.00	1.00
	White	**0.73 (0.56, 0.94)**	**0.70 (0.54, 0.91)**
	Other	**2.25 (1.70, 2.96)**	1.24 (0.85, 1.79)
Ethnicity	Non-Hispanic	1.00	1.00
	Hispanic	**4.08 (2.96, 5.63)**	**3.31 (2.16, 5.07)**

Abbreviations: Adj, Adjusted; CI confidence interval; OR, Odds Ratio; n, number; NH non-Hispanic.

Supplemental Table 2b: Demographic Characteristics Associated with Evidence of Vaccination among 2380 Emergency Department Patients, January –March 2021

Characteristics	Category	Crude OR (95% CI)	Adjusted OR (95% CI)
Age	18-29 years	1.00	1.00
	30-44 years	1.03 (0.70, 1.51)	0.98 (0.67, 1.45)
	45-59 years	**0.48 (0.30, 0.77)**	**0.50 (0.31, 0.80)**
	60-74 years	1.05 (0.70, 1.56)	1.09 (0.73, 1.65)
	≥ 75 years	0.96 (0.55, 1.68)	0.86 (0.49, 1.52)
Sex	Male	1.00	1.00
	Female	**1.36 (1.03, 1.80)**	**1.35 (1.02, 1.80)**
Race	Black	1.00	1.00
	White	**2.30 (1.71, 3.11)**	**2.26 (1.67, 3.07)**
	Other	**2.61 (1.73, 3.91)**	**2.42 (1.51, 3.88)**
Ethnicity	Non-Hispanic	1.00	1.00
	Hispanic	**1.88 (1.13, 3.13)**	1.25 (0.69, 2.29)

Abbreviations: Adj, Adjusted; CI confidence interval; OR, Odds Ratio; n, number; NH non-Hispanic.

Supplemental Figure 1a. Determination of sensitivity and specificity of vaccinated state in three-step testing algorithm.

Supplemental Figure 1b. Determination of sensitivity and specificity of previously infected state in three-step testing algorithm.

Supplemental Figure 2a. Determination of sensitivity and specificity of vaccinated state in testing algorithm using CoronaCHEK only as the screening assay for reactivity to spike/RBD.

Supplemental Figure 2b. Determination of sensitivity and specificity of previously infected state in testing algorithm using CoronaCHEK only as the screening assay for reactivity to spike/RBD.

Supplemental Figure 3a. Testing algorithm results for ED samples collected in 2020.

Supplemental Figure 3b. Testing algorithm results for ED samples collected in 2021.
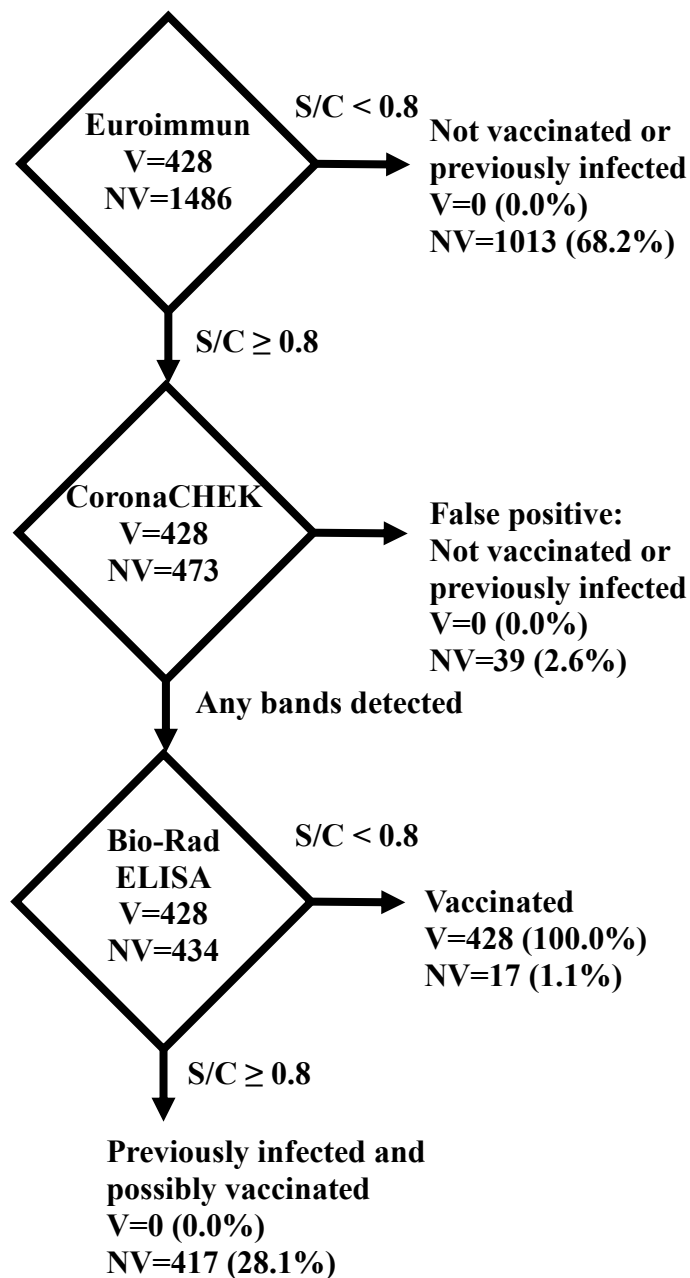
Supplemental Figure 4a. Euroimmun S/C values of antibody response against spike protein by days post-second dose or confirmed infection. Euroimmun index values were plotted against

time since receipt of the second dose of a vaccine (vaccinated samples) or time since confirmed

SARS-CoV-2 PCR-positive infection (infected samples and vaccinated/infected samples).

Supplemental Figure 4b. Bio-Rad S/C values of antibody response against nucleocapsid by

days post-second dose or confirmed infection. Bio-Rad index values were plotted against time

since receipt of the second dose of a vaccine (vaccinated samples) or time since confirmed

SARS-CoV-2 PCR-positive infection (infected samples and vaccinated/infected samples).

Supplimental Figure 1a.

	Known Vaccinated	Not vaccinated
Vaccinated by algorithm (Euroimmun & CoronaCHEK positive/ BioRad Negative)	**428**	**17**
Not vaccinated by algorithm (Any other result)	**0**	**1469**

Euroimmun
V=428
NV=1486

S/C < 0.8 → **Not vaccinated or previously infected**
V=0 (0.0%)
NV=1013 (68.2%)

S/C ≥ 0.8

CoronaCHEK
V=428
NV=473

→ **False positive: Not vaccinated or previously infected**
V=0 (0.0%)
NV=39 (2.6%)

Any bands detected

Bio-Rad ELISA
V=428
NV=434

S/C < 0.8 → **Vaccinated**
V=428 (100.0%)
NV=17 (1.1%)

S/C ≥ 0.8

Previously infected and possibly vaccinated
V=0 (0.0%)
NV=417 (28.1%)

Sample Sets used for the analysis
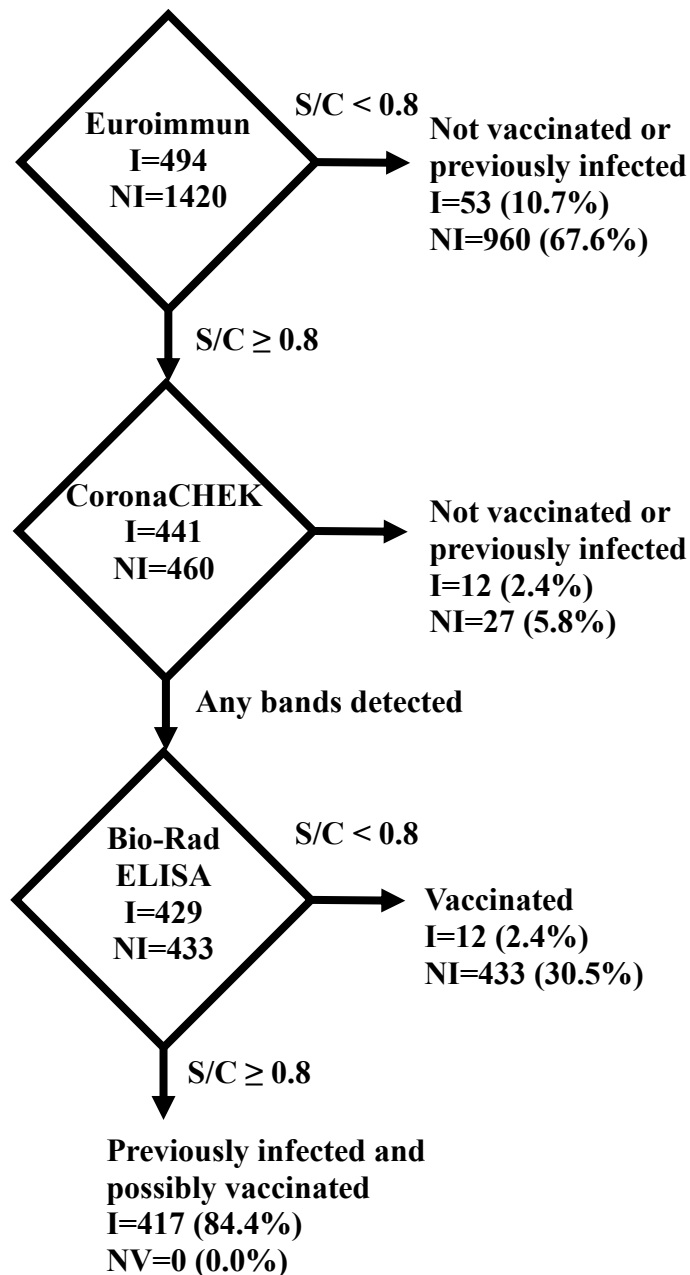**Vaccinated (V)**
Vaccine trial participants (n=68)
Health Care Professionals (n=360)

Not Vaccinated (NV)
Convalescent plasma donators (n=244)
Clinical Characterization Protocol for Severe Infectious Diseases (n=246)
Infected health care professionals (n=4)
Pre-pandemic samples (n=992)

Figure 1b.

	Infected	Not Infected
Infected by algorithm **(Euroimmun & CoronaCHEK positive/ BioRad Positive)**	**417**	**0**
Not infected by algorithm **(Any other result)**	**77**	**1420**

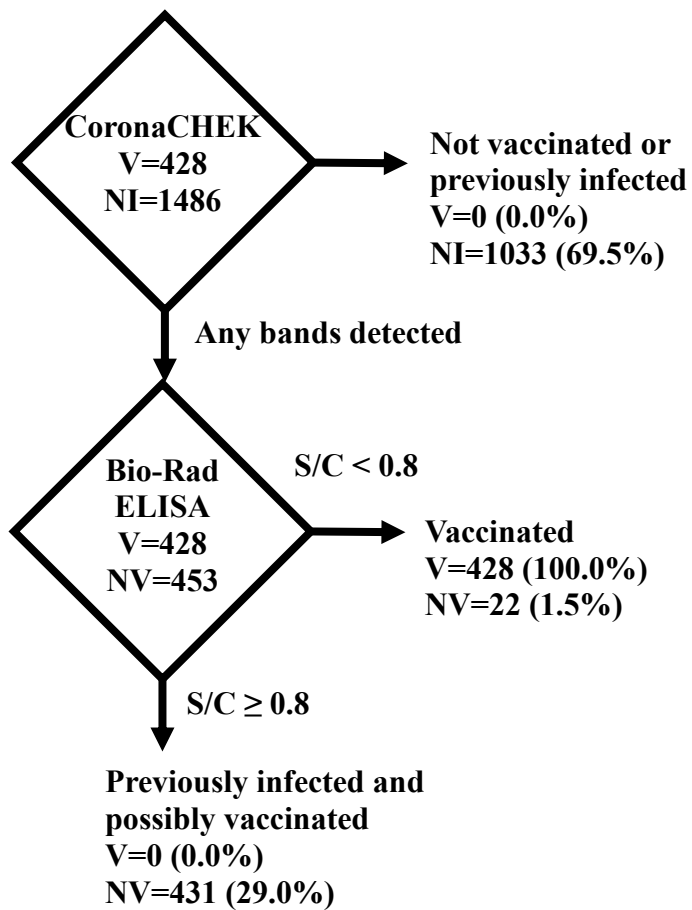**Sample Sets used for the analysis**
Infected (I)
Convalescent plasma donators (n=244)
Clinical Characterization Protocol for
Severe Infectious Diseases (n=246)
Infected health care professionals (n=4)

Not Infected (NI)
Vaccine trial participants (n=68)
Health Care Professionals (n=360)
Pre-pandemic samples (n=992)

Euroimmun
I=494
NI=1420

S/C < 0.8
Not vaccinated or
previously infected
I=53 (10.7%)
NI=960 (67.6%)

S/C ≥ 0.8

CoronaCHEK
I=441
NI=460

Not vaccinated or
previously infected
I=12 (2.4%)
NI=27 (5.8%)

Any bands detected

Bio-Rad
ELISA
I=429
NI=433

S/C < 0.8
Vaccinated
I=12 (2.4%)
NI=433 (30.5%)

S/C ≥ 0.8

Previously infected and
possibly vaccinated
I=417 (84.4%)
NV=0 (0.0%)

	Known Vaccinated	Not Vaccinated
Vaccinated by algorithm **(CoronaCHEK positive/ BioRad Positive)**	**428**	**22**
Not vaccinated by algorithm **(Any other result)**	**0**	**1464**

CoronaCHEK
V=428
NI=1486

Not vaccinated or
previously infected
V=0 (0.0%)
NI=1033 (69.5%)

Any bands detected

Bio-Rad
ELISA
V=428
NV=453

S/C < 0.8

Vaccinated
V=428 (100.0%)
NV=22 (1.5%)

S/C ≥ 0.8

Previously infected and
possibly vaccinated
V=0 (0.0%)
NV=431 (29.0%)

Sample Sets used for the analysis
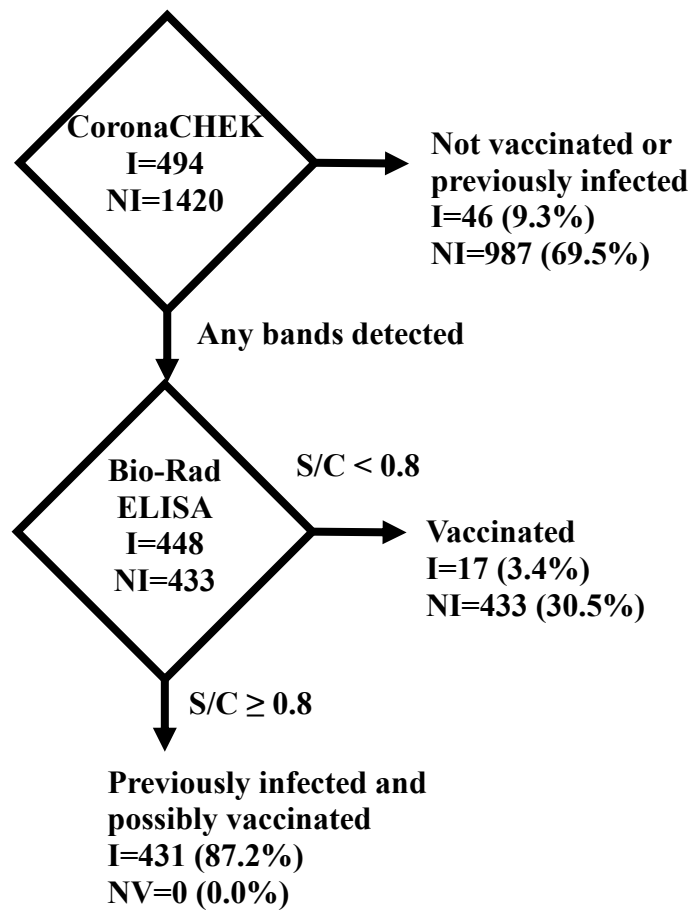**Vaccinated (V)**
Vaccine trial participants (n=68)
Health Care Professionals (n=360)

Not Vaccinated (NV)
Convalescent plasma donators (n=244)
Clinical Characterization Protocol for
Severe Infectious Diseases (n=246)
Infected health care professionals (n=4)
Pre-pandemic samples (n=992)

Supplementary Figure 2b. (CoronaCHEK Algorithm)

	Known Infected	Not Infected
Infected by algorithm **(CoronaCHEK positive/ BioRad Positive)**	**431**	**0**
Not infected by algorithm **(Any other result)**	**63**	**1420**

CoronaCHEK
I=494
NI=1420

→ **Not vaccinated or previously infected**
I=46 (9.3%)
NI=987 (69.5%)

Any bands detected

Bio-Rad ELISA
I=448
NI=433

S/C < 0.8 → **Vaccinated**
I=17 (3.4%)
NI=433 (30.5%)

S/C ≥ 0.8

Previously infected and possibly vaccinated
I=431 (87.2%)
NV=0 (0.0%)

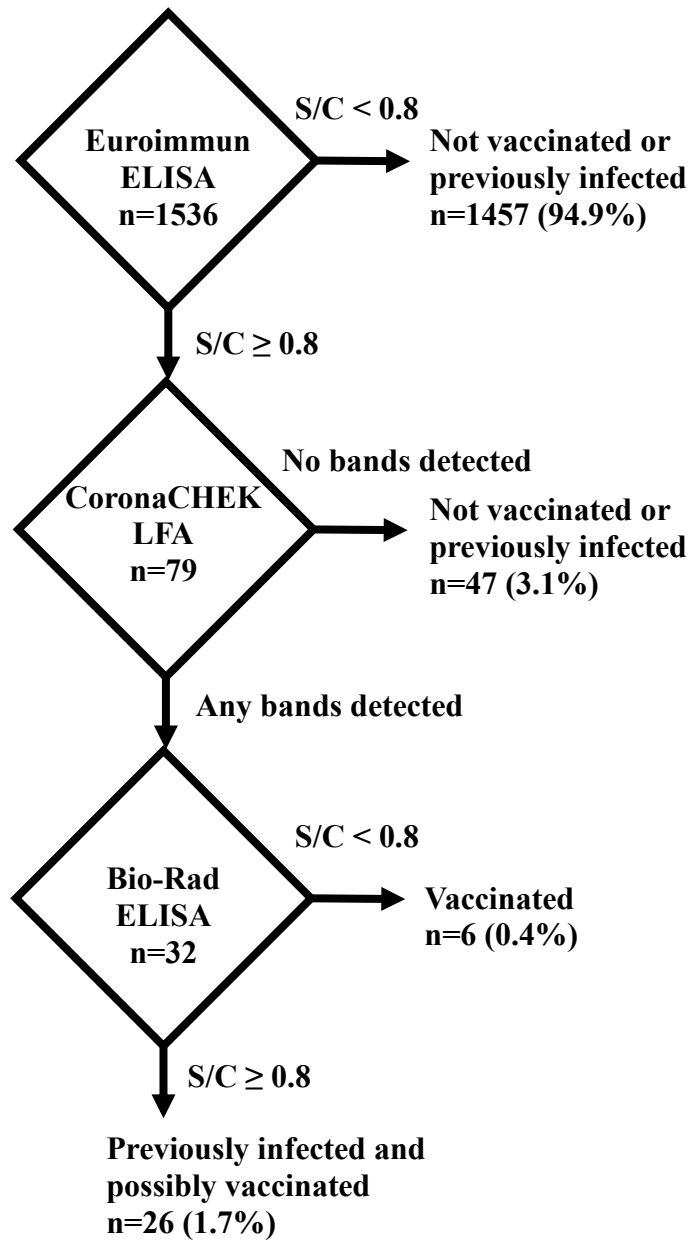**Sample Sets used for the analysis**
Infected (I)
Convalescent plasma donators (n=244)
Clinical Characterization Protocol for Severe Infectious Diseases (n=246)
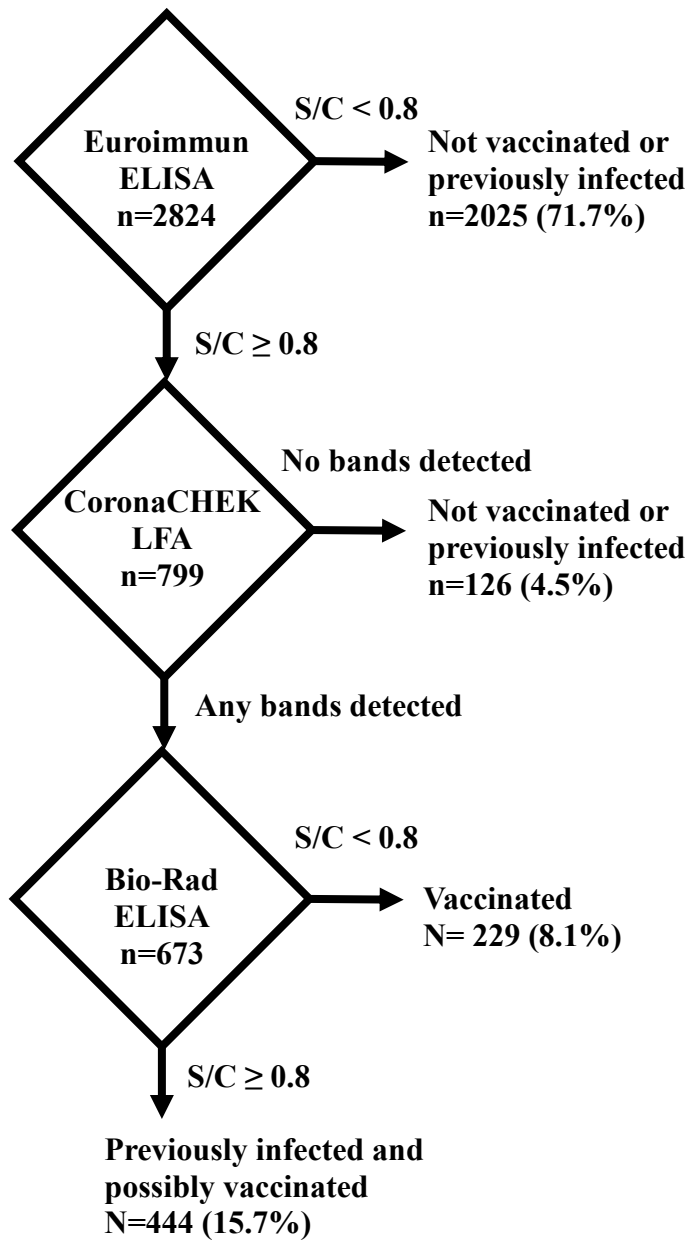Infected health care professionals (n=4)

Not Infected (NI)
Vaccine trial participants (n=68)
Health Care Professionals (n=360)
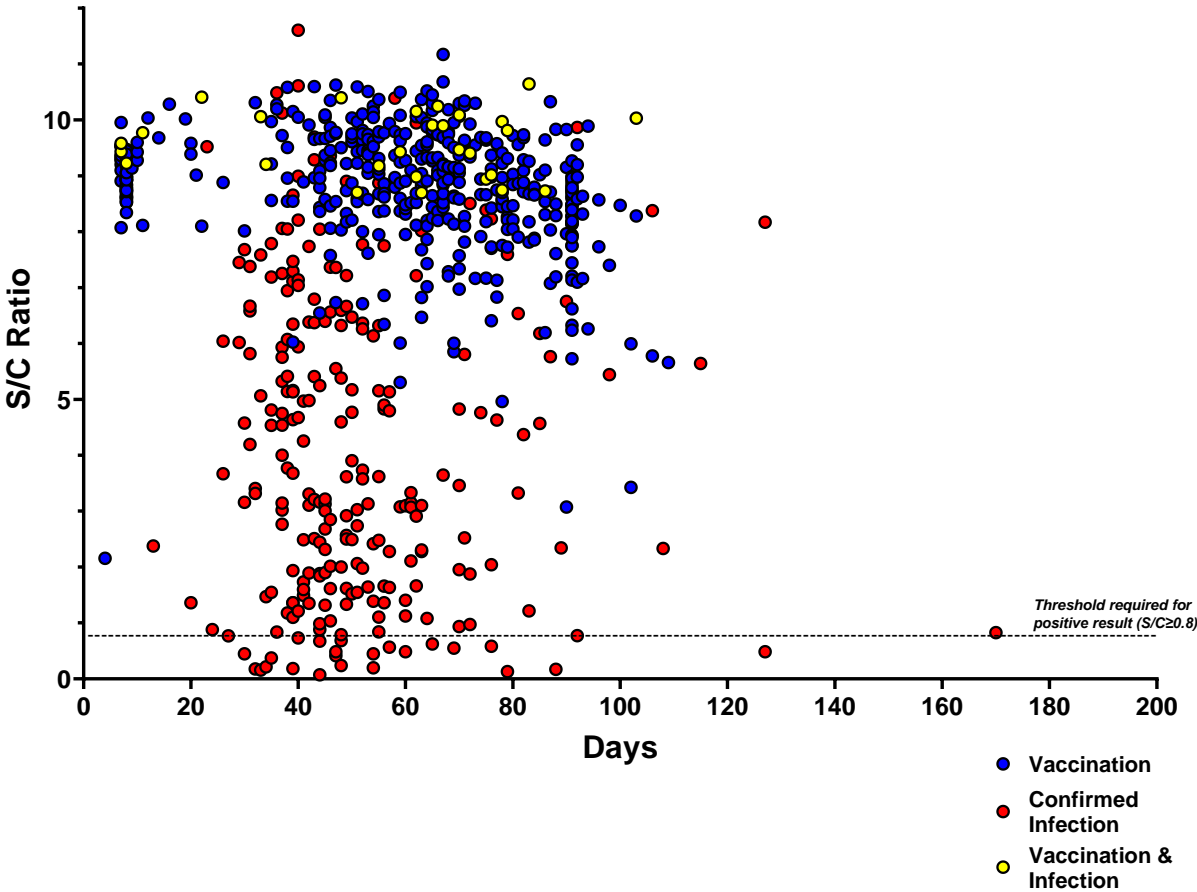Pre-pandemic samples (n=992)

Supplementary Figure 3a.

Supplementary Figure 3b.

Euroimmun ELISA n=2824

S/C < 0.8 → Not vaccinated or previously infected n=2025 (71.7%)

S/C ≥ 0.8

CoronaCHEK LFA n=799

No bands detected → Not vaccinated or previously infected n=126 (4.5%)

Any bands detected

Bio-Rad ELISA n=673

S/C < 0.8 → Vaccinated N= 229 (8.1%)

S/C ≥ 0.8 → Previously infected and possibly vaccinated N=444 (15.7%)

Supplementary Figure 4a.

Supplementary Figure 4b.